Originator:	AWCR:	Design Supv:	Project/CE:
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PROCESS SPECIFICATION

Active Amendment
Amendment 069556A

1. SCOPE.

1.1 Scope. This specification prescribes methods for the application of identification and part number marking on parts, assemblies, and equipment.

1.2 Effectivity. This specification is a complete revision of TPS 4-1L, dated 22 May 2002, and is effective upon release of the Document Release Notice (DRN). Changed paragraphs from the previous revision are marked by a solid black bar in the left-hand margin.

1.3 Equivalency. Identification and part number marking methods of this document meet or exceed the requirements of MIL–STD–130 or as otherwise evaluated and approved for use by the Engineering Materials and Processes.

1.4 Drawing reference. If a specific marking method is desired it shall be specified on the Engineering drawing. Metal stamping, engraving, and vibrating pencil methods are controlled by TPS 4-10, which must be specified on the Engineering drawing to authorize their use. Whenever Greenville drawings released prior to 03 December 1999 state "Rubber stamp per TPS 4-1", any marking method specified in TPS 4-1 is acceptable.

2. APPLICABLE DOCUMENTS.

2.1 Government documents. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the current issue shall apply.

SPECIFICATIONS

Federal

TT–N–95	Naphtha; Aliphatic
A–A–208	Ink, Marking, Stencil, Opaque
CCC-C-440	Cloth, Cheesecloth, Cotton, Bleached and Unbleached
A-A-665	Lacquer
P–D–680	Dry–Cleaning and Degreasing Solvent
TT-I-735	Isopropyl Alcohol
A-A-56032	Ink, Marking, Epoxy Based

Military

MIL-PRF-81352	Coating, Aircraft Touch-up

MIL-PRF-85285 Coating: Polyurethane, High-Solids

STANDARDS

Federal

FAR Part 21 Certification Procedures for Products and Parts

FAR Part 45 Identification and Registration Marking

FED–STD–595 Colors Used In Government Procurement

Military

MIL–STD–130 Identification Marking of U.S. Military Property

2.2 **Non-Government documents.** The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the current issue shall apply.

SPECIFICATIONS

L-3 Communications Integrated Systems Technical Process Specifications

TPS 1–418 Class 1A Chromate Conversion Coating for Aluminum Alloys

TPS 1–605 Silk Screen Stenciled Markings, General Requirements for

TPS 4–3 Identification Plates, Information Markers, Fabrication of (Photo Sensitive Material)

TPS 4–5/1 Plates and Markers, Color Anodized Aluminum, Fabrication of

TPS 4–8 Pressure Sensitive Decalcomania, Application of

TPS 4–9 Stencils, Fabrication and Application of

TPS 4–10 Engraving and Metal Stamping, Procedure for

TPS 4-12 Identification and Information Markers, (Thermally Printed Material)

TPS 8–20 Electric Wiring and Fiber Optic Cable, Identification of

STANDARDS

Industry

American Society for Testing and Materials

ASTM D841 Nitration Grade Toluene

National Aerospace Standards

NASM 20995 Wire, Safety or Lock

Institute of Electrical Electronics Engineers Inc.

IEEE200 — IEEE Standard Reference Designations for Electrical and Electronics Parts and Equipment

Institute for Interconnecting and Packaging Electronic Circuits

IPC-CC-830 — Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies

3. REQUIREMENTS.

3.1 Equipment.

3.1.1 Rubber stamp. Single unit, adjustable type, capable of stamping 20 characters shall be used, commercially available.

3.1.2 Ink stamp pad. Color as specified, size optional, manufactured by Organic Products, Cage 01195, or equivalent.

3.1.3 Ink jet/laser jet. Imaje™ Ink Jet Printing System including a Jaime™ 1000 single printhead or other equivalent commercially available equipment designated by Materials and Processes Engineering and Production Engineering meeting the requirements of this specification.

3.1.4 EZ-Label printer. EZ-label printer KL-2000 available from Casio Computer Co. GACE 5M485 or equivalent as approved by M&P Engineering.

3.2 Materials.

3.2.1 Stamp ink. The appropriate ink shall be selected from Table I**.

TABLE I INK SELECTION

PART NUMBER	TYPE INK	AVAILABLE COLORS	COMMENTS	STAMP PAD ACTIVATOR	MANUFACTURER
F–100	Permanent	Black, Red, Blue, Silver, Green, Purple	Silver Color * Contains Aluminum Pigment	F-100 Reactivator	Organics Products Company, Cage, 01195
F–150	Permanent	White, Yellow, Black, Orange, Red, Blue, Green	Meets A–A–208		
73XNW	Permanent	Black	Meets A–A–208	73XNW Reconditioner	Independent Ink Company, Cage 12744
59-XXX	Permanent	Black, White	Meets A-A-56032	N/A	NAZ-DAR, Cage 76708
50-XXX	Permanent	Black, White	Meets A-A-56032	N/A	Ethone-OMI, Cage 02258

***Note:** Silver color contains aluminum pigment, whose markings may be conductive.

****Note:** This table provides inks for rubber stamping only. Ink for the ink jet/laser jet, see paragraph 3.2.5.

3.2.1.1 **Stamp pad activators.** Solvent activators are used to replace solvents that evaporate from the stamp pad. Use the appropriate activator from Table I to moisten stamp pad.

3.2.2 **Metal tags**. To be fabricated in–house from scrap metal as required. Material shall be the same as, or compatible with, the base metal: 5052 or 3003 for aluminum, 304 or 302 stainless for steels. Attachment hole shall be size #40.

3.2.3 **Fuel–resistant protective overcoating.** EC776SR part number, one component, transparent, red, fuel–resistant coating, manufactured by 3M, Cage 04963, or equivalent.

3.2.4 **Tag wire.** Tag wire conforming to NASM 20995, or equivalent.

3.2.5 **Ink for ink jet/laser jet.** Ink jet/laser jet ink, available from Imaje Ink Jet Printing Corporation, Cage 0ZH07 or equivalent.

3.2.6 **Solvents.** MPK, commercial grade, naphtha conforming to TT–N–95, toluene per ASTM D841, dry cleaning solvent conforming to P–D–680, Type II, and isopropyl alcohol conforming to TT-I-735.

3.2.7 **Paint.** Paints conforming to MIL-PRF-81352, A-A-665, IPC-CC-830 or MIL-PRF-85285 Type I shall be used. Consult Engineering Materials and Processes when another type is specified on the drawing.

3.2.8 **Labels/decals.** Commercially available labels shall be designated by Materials and Processes Engineering (M&P) and Production provided the labels are as permanent as the normal life expectancy of the item to which they are applied and capable of withstanding the environmental tests and cleaning procedures specified for that item. Any questions will be addressed by Production and M&P on specific applications. Testing documentation will be maintained by M&P.

3.2.9 **Cheesecloth.** Cheesecloth per CCC-C-440 Class C or Rymplecloth or equivalent.

3.2.10 **Transparent tape.** Transparent tape, 3750 clear, available from 3M, Cage 04963 or equivalent.

3.2.11 **Label tape.** Label tape IR-9WE, Casio Computer Co., Cage 5M485, or equivalent.

3.2.12 **Pens.** Sharpie permanent markers from Sanford Corp, series 30000, Cage 86874.

3.3 **General requirements.**

3.3.1 **Safety and chemical handling.** Hazardous chemicals and waste disposal shall be per the appropriate Safety and Quality Control Procedures.

3.3.2 **Detail parts.** Parts that are not permanently joined or attached to other identified parts or assemblies shall be permanently identified with the identifying number. Parts that are too small to identify shall be tag identified, (i.e. Company standard radius blocks and spacers like TS8885, TS8827 and TS8850 that shall become part of an assembly or installation shall be tag identified). Purchase parts shall be marked in accordance with the Engineering drawing requirements. The final top assembly part number should be visible after final installation. If several of the same small parts are in bags with the part identification on the bag, each individual part shall be immediately installed or separately identified upon removal from the bag.

NOTE: A part or sub-assembly may consist of several smaller parts or pieces permanently joined together.

3.3.3 **Fabrication parts or assemblies.** Fabrication parts or assemblies that leave the production shop that are not permanently joined or attached to other identified parts or assemblies shall be permanently identified with the identifying number (6.2.1). Parts that are too small to identify shall be tag identified. Purchase parts shall be marked in accordance with the Engineering drawing requirements. The final assembly part number should be visible after final installation.

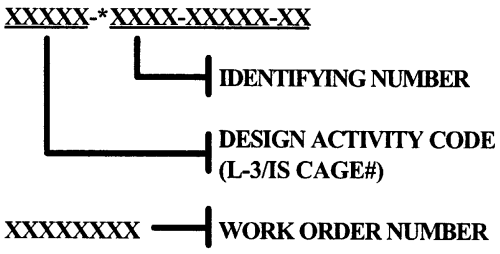
3.3.4 **Non-permanent markings.** Non–permanent markings are used during process or fabrication sequences or manufacture. These numbers are considered non-permanent and shall not be used as the official part number that must be placed on the completed assembly or unit. Paper tags may be used as a method of non-permanent marking. Markings on the paper tags may be applied by an ink jet, thermal printer or hand lettered.

3.3.5 **Marking method not specified on Engineering drawing.** When the method of marking is not specified on the Engineering drawing, the method shall be established by Production, except metal stamping, engraving, and vibrating pencil shall not be used.

3.3.6 **Marking information.** Parts and/or assemblies shall be marked per one of the methods listed in Table III with L-3 Communications Integrated Systems (L-3/IS) Cage Code, a dash or slant, and identifying number.

3.3.6.1 **When parts are designed and manufactured by L-3/IS.**

3.3.6.1.1 **Part revision status is not used.** When parts are designed and manufactured by L-3/IS and part revision status is not used, the marking shall be arranged per Figure 1.



*** DASH MAY BE REPLACED BY A SLASH OR REVISION NUMBER**

FIGURE 1
SAME DESIGNER AND MANUFACTURER

Note: Cage Code may be placed above the identifying number when adequate spacing does not permit.

3.3.6.1.2 Part revision status is used.

3.3.6.1.2.1 New parts. When newly manufactured parts are designed and manufactured by L-3/IS and part revision is used, the marking shall be arranged per Figure 2A. Planning will write a work order to supplement the identification of fabricated parts/assemblies when an ECO (Engineering Change Order) is initiated by engineering to change the configuration of a fabricated part/assembly and has a second disposition stating existing fabricated part/assemblies in stock are acceptable for installation. The latest revision established by the ECO will be stamped on the part assembly in stock and surrounded by brackets (reference Figure 2A). The identification will be inspected by a Quality representative or a Certified Operator. The revision with brackets will indicate the change in parts/assembly configuration and will alert personnel the current configuration is acceptable for installation and assembly. This does not apply when the original parts do not conform to the print or revision to which they were built. It also does not apply if the ECO changes form, fit, or function.

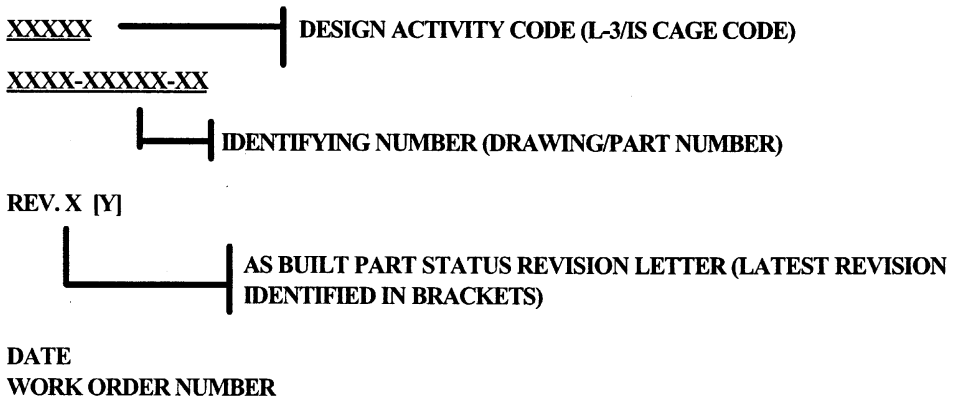


FIGURE 2A
SAME DESIGNER AND MANUFACTURER USING PART REVISION STATUS

Note: Cage Code may be placed in front of the identifying number.

Note: The Date may be placed beside the revision.

3.3.6.1.2.2 Reworked parts. When newly manufactured parts are designed, manufactured, and reworked by L-3/IS and part revision is used, the marking shall be arranged per Figure 2B to keep traceability to the original and rework manufacturing work order. Planning will write a work order to supplement the identification of fabricated parts/assemblies when an ECO (Engineering Change Order) is initiated by engineering to change the configuration of a fabricated part/assembly and has a second disposition stating existing fabricated part/assemblies in stock are acceptable for installation. The latest revision established by the ECO will be stamped on the part assembly in stock and surrounded by brackets (reference Figure 2B). The identification will be inspected by a Quality representative or a Certified Operator. The revision with brackets will indicate the change in parts/assembly configuration and will alert personnel the current configuration is acceptable for installation and assembly. This does not apply when the original parts do not conform to the print or revision to which they were built. It also does not apply if the ECO changes form, fit, or function.

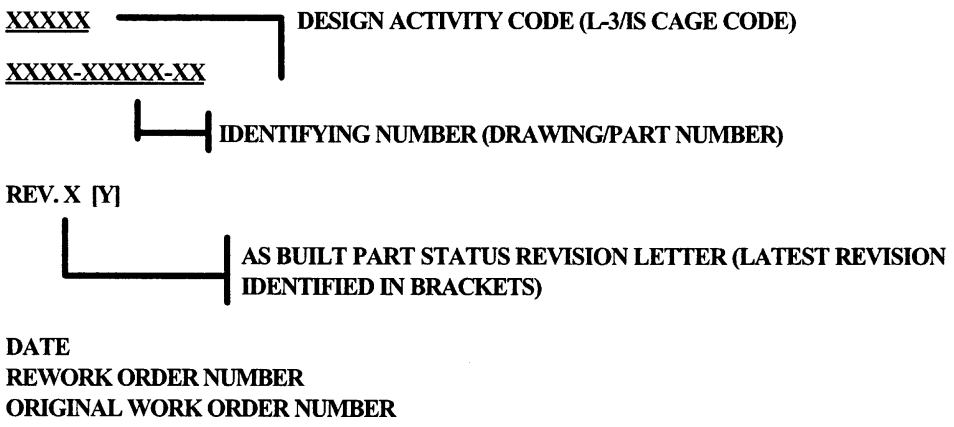
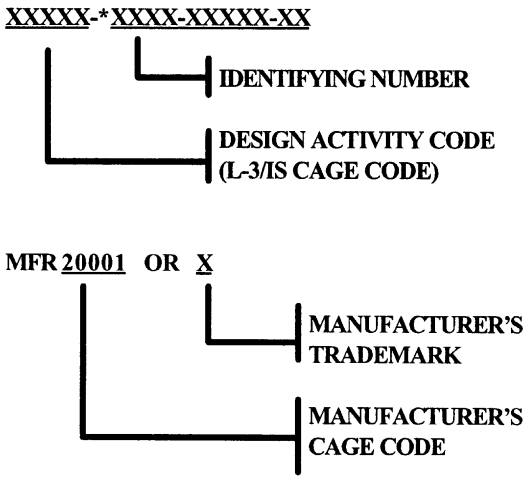


FIGURE 2B
SAME DESIGNER AND MANUFACTURER USING PART REVISION STATUS

Note: Cage Code may be placed in front of the identifying number.

Note: The Date may be placed beside the revision.

3.3.6.2 When parts are designed by L-3/IS but manufactured elsewhere, the markings shall be arranged per Figure 3.



***DASH MAY BE REPLACED BY A SLASH OR REVISION NUMBER**

FIGURE 3
DIFFERENT DESIGNER AND MANUFACTURER

3.3.6.3 When parts are not designed by L-3/IS and are manufactured by other than the original design activity for L-3/IS, the markings shall be arranged as shown in Figure 4.

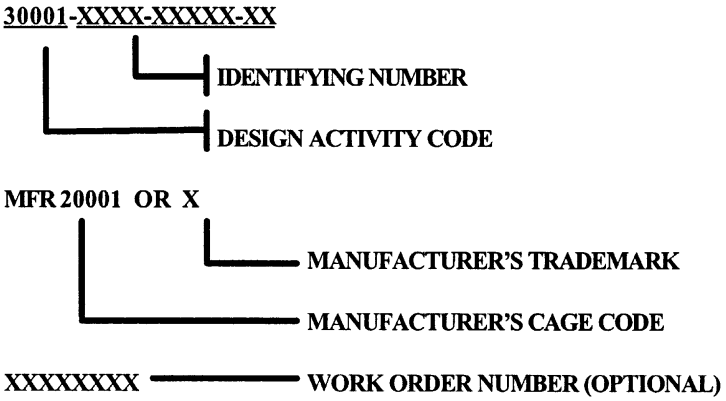


FIGURE 4
DIFFERENT DESIGNER AND DIFFERENT MANUFACTURER

3.3.6.4 When the design activity is not the original design activity, the markings shall be per Figure 5.

XXXXX-XXXXXXX-XXXX Original Design Activity Item Identification
CDA-XXXXX Current Design Activity CAGE
MFR-XXXXX Manufacturers CAGE

Alternate Method

XXXXX-XXXXXXX-XXXX Original Design Activity Item Identification
CDA-XXXXX MFR -XXXXX Manufacturer's CAGE
Current Design Activity CAGE

FIGURE 5
MANUFACTURERS OTHER THAN DESIGN ACTIVITY

3.3.7 **Assemblies.** Assemblies shall be marked with Cage Code, the notation "Assy", the assembly identifying number and manufacturer's identification if procured from a manufacturer other than L-3/IS per Figure 6.

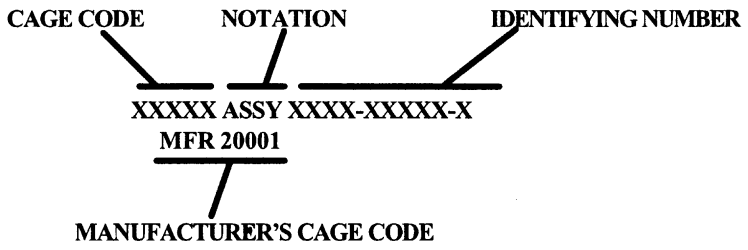


FIGURE 6
ASSEMBLY IDENTIFICATION

3.3.8 **PMA marking.**

3.3.8.1 Each replacement or modification part produced for sale under a Parts Manufacturer Approval issued per paragraph 21.303 of FAR Part 21 shall be permanently and legibly marked with identifying information per FAR Part 45. This includes each part or subassembly that leaves the Production Shops and is not joined or attached to other identified parts or assemblies. Each part shall be permanently identified with the following information:

a. The letters "FAA-PMA".
b. The name, trademark, or symbol of L-3/IS.
c. The part number per the Engineering Drawing.
d. The name and model designation of each type certified product on which the part is eligible for installation.

3.3.8.2 When parts are manufactured under a Parts Manufacturer Approval the markings shall be arranged as shown in Figure 7.

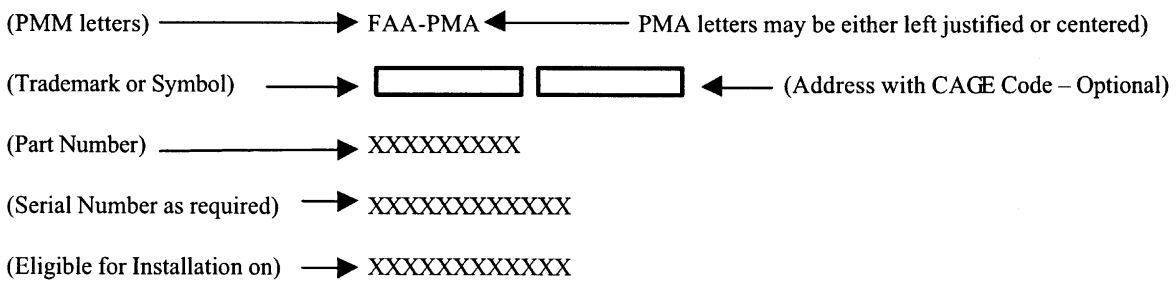


FIGURE 7
PMA IDENTIFICATION

3.3.8.3 If the parts are too small for identification or marking, a tag of suitable size will be utilized and the requirements specified above will be met.

3.3.8.4 If the eligibility marking required is so extensive that to mark it is impractical, the identification attached to the part or container will refer to a specific, readily available document for part eligibility information.

3.3.9 **Colors.** Colors used for marking are listed in Table II. Colors other than those listed in Table II or more contrasting colors may be applicable when referenced on Engineering Drawings.

TABLE II
COLOR OF MARKINGS

COLOR	BACKGROUND
Black	Unpainted Metal Epoxy Polyamide Primer Fiberglass Laminate White Colored Surfaces Silver Colored Surfaces
Black	Light Grey
White	Dark Grey
White or Silver	Dark Colored Surfaces Red Colored Surfaces Rubber Surfaces
Blue	Contrasting Colors

Notes: Paint colors per FED-STD-595 may be used as a guide.

3.3.10 **Lettering style and size.** When the letter style and size is not specified on the Engineering Drawing, it shall be established for the area by Production Engineering.

3.3.11 **Marking location.** The marking requirement shall be as specified on the Engineering drawing. When the Engineering drawing does not specify the location, the preferred location is where the markings will not impair the function of the part and not be visible on the exterior surface of completed assembly. The marking on the part shall ensure identification is not covered after assembly. The location for the marking when specified on the Engineering drawing shall be as close as practical to the area specified, but always on the same surface. The markings shall be parallel to the longest edge of the part and approximately in the same location for all like parts.

3.3.12 **Prohibited markings.** Marking by grease pencil, wax crayon, graphite pencil, or by masking tape shall not be permitted for permanent markings.

3.3.13 **Shelf life and storage conditions.** Stamp ink, silk screen enamels, paints, and protective overcoatings are limited life items and shall be stocked in a controlled environment (40°F to 90°F) area prior to use. Shelf life on these items is the greater of the manufacturer's recommendation or 18 months.

3.4 **Procedure.**

3.4.1 **Marking methods.** Marking methods are listed in Table III. All markings, regardless of method, shall be legible. Permanent markings shall be as permanent as the normal life expectancy of the item and be capable of withstanding the environmental tests and cleaning procedures specified for the item to which it is affixed.

TABLE III
MARKING METHODS

MARKING METHOD	PARAGRAPH	REMARKS
Rubber Stamping/Ink Jet/Laser Jet	3.4.2	Permanent or Non permanent
Metal Stamping/Engraving	3.4.3	Permanent
Vibrating Pencil	3.4.4	Permanent
Metal Tags	3.4.5	Permanent or Non permanent
Stenciling	3.4.6	Permanent
Silk Screen	3.4.7	Permanent
Nameplates	3.4.8	Permanent
Decalcomania	3.4.9	Permanent
Hand Lettering	3.4.10	Permanent
Electrical Wiring	3.4.11	Permanent

3.4.2 **Rubber stamping/ink jet marking/laser jet marking.** The surface of unpainted parts shall be thoroughly cleaned using a cleaning solvent per 3.2.6. The solvent shall be wiped dry to prevent solvent residue from accumulating. Isopropyl alcohol shall be used for cleaning painted surfaces. The proper ink shall be selected from Table I based on color and permanency requirements. The use of 73XNW ink is restricted to fuel areas where markings must be overcoated or where its long drying time (15–20 minutes) is acceptable. The Organics Products Co. inks dry in less than two minutes.

3.4.2.1 **Changing colors.** Surfaces of the rubber stamp shall be cleaned with naphtha or toluene prior to changing colors or ink.

3.4.2.2 **Prior processes to permanent rubber stamping/ink jet marking/laser jet marking.** Processes such as conversion coating, plating, heat treating, prime and paint, etc., shall be completed prior to permanent rubber stamping/ink jet marking/laser jet marking. Non-permanent markings shall be used during the manufacturing process sequences.

3.4.2.3 **Overcoating of markings.** Rubber stamp/ink jet/laser jet markings requiring solvent resistance, such as reference designators or face panels, shall be overcoated using clear coating per 3.2.7. Rubber stamp/ink jet/laser jet markings for sub–assemblies or part numbers for sheet metal parts do not require overcoating unless they must meet solvent resistance requirements.

3.4.2.4 **Restrictions.** Rubber stamping/ink jet marking/laser jet marking using ink shall not be applied to parts used in systems where hydrogen peroxide, gaseous oxygen or liquid oxygen can come in contact with the marking.

3.4.3 **Metal stamping/metal engraving.** Metal stamping/engraving shall be accomplished per TPS 4-10 and shall only be permitted when TPS 4-10 is specified on the Engineering drawing.

3.4.4 **Vibrating pencil.** Pencil shall be accomplished per TPS 4-10 and shall only be permitted when TPS 4-10 is specified on the Engineering drawing.

3.4.5 **Metal tags.** Metal tags shall be attached to parts to provide identification during sequences of manufacturing process that would destroy or obliterate other methods of identification. Inspection stamps or other markings may be applied to the tag to indicate completion of a particular phase of manufacture or to indicate acceptance. Metal tags may be used as a permanent or non-permanent method of marking.

3.4.6 **Stencils.** Stencils shall be fabricated per TPS 4–9. Stencil color markings shall be as specified in Table II unless otherwise specified on the Engineering drawing. When stencils are required for fiberglass laminates and other plastic materials, the marking shall be applied using polyurethane paint (3.2.7).

3.4.6.1 **Sanding preparation.** When possible, glossy plastic surfaces shall be lightly sanded with sandpaper to remove the gloss in the immediate area for stenciling. Sanding residue shall be removed by solvent wiping with isopropyl alcohol.

3.4.6.2 **Metal surfaces.** Solvent clean using MPK solvent to remove oil, grease, and other surface contaminates. The solvent shall be wiped dry to prevent solvent residue. Bare aluminum surfaces shall be treated per TPS 1–418.

NOTE: These surface preparation methods will not be possible in all applications and shall only be applicable when such surface treatments will not harm or degrade the appearance of the surface to be stenciled.

3.4.6.3 **Paint color.** Colors per FED–STD–595 or defined commercial color number.

3.4.6.4 **Application.** Markings are applied to a surface by placing the stencil in intimate contact with the surface at the location specified on the Engineering drawing. The stencil may be held in place by using tape. The marking may be applied by paint spray or stencil brush. Do not allow stencil to move while paint is being applied.

3.4.6.5 **Stenciling on webbing.** If the surface texture or fabric is too rough to permit clear adherent markings to be applied by stenciling, apply the required markings by techniques per 3.4.2 using enamel per 3.2.7.

3.4.7 **Silk screen.** Silk screen stencil shall be per TPS 1–605.

3.4.8 **Nameplates.** Nameplates shall be fabricated per TPS 4–3 or 4–5/1 or as referenced on the Engineering drawing.

3.4.9 **Decalcomanias.** Decals shall be fabricated per TPS 4-3 and applied per TPS 4-8. EZ-labels may be used as necessary.

3.4.9.1 **Thermal printed decals.** Thermal printed decals shall be fabricated per TPS 4-12.

3.4.9.2 **Photosensitive markers.** Photosensitive markers shall be fabricated per TPS 4–3.

3.4.10 **Hand lettering.** Permanent pens/markers per 3.2.13 or the marking materials specified for stenciling or rubber stamping shall be used. The markings shall be uniform and legible. If free-hand lettering is utilized, the lettering shall be such that alphabetical characters are distinguishable from the numeric characters; see example in Figure 8.

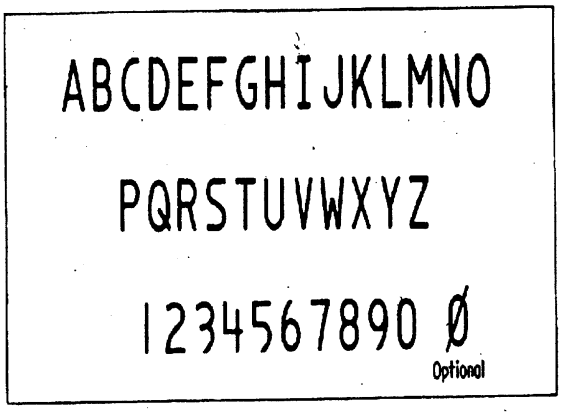


FIGURE 8
LETTERING

3.4.11 **Electrical wire.** Marking and identification of electric wire shall be per TPS 8–20.

3.4.12 **Packaging.** The package shall be identified and marked as referenced on the Engineering drawing. The part quantity shall also be listed. Packaging shall consist of bag, envelope, or container. Only one ship set, one part, or assembly shall be packaged per Planning next assembly requirements. Spare parts shall be packaged. On nested tickets, the package shall reflect the quantity released on "P" released work orders.

3.4.13 **Integral fuel tanks or fuel exposed areas.** When parts or areas required to be identified will be exposed to fuel, the following applies. Rubber stamp the required parts per 3.4.2. Allow ink to dry per Manufacturing Engineering established drying methods. Overcoat the stamped area with one coat of EC–776SR (3.2.3) and let air dry for one hour.

3.4.14 **Serialization.** All configuration items shall have a serial number applied. This serial number shall be applied by rubber stamp (3.4.2), by decalcomania (3.4.9), or by hand lettering with marking ink (3.2.1). The data shall be applied prior to first inspection after first item has been attached to a mating piece. The marking location shall be specified by Engineering. If not specified, the marking location shall be as close to the part number as practical. Unless otherwise specified, the lettering shall be 0.06 inch high minimum.

3.4.15 **Tool revision letter.** All circuit board assemblies identified shall contain the configuration revision letter specified by the drawing. The revision letter marked on the sub-assembly denotes the current revision of the board. In the case of printed wiring boards, it denotes the drawing revision level that contains the artwork tool call-outs to be used in the manufacture of the item. In the case of a wire wrap board, it is the paper tape or computer file tool that drives the wire wrap machine. The tool number revision letter should change every time a change is made to the tool.

3.4.16 **Equipment identification on front panel – Electronic Development units only.** Equipment identified with an "E" number (example: ECT102 _**** _*) which does not have the unit identification, nameplate or other identification on the front panel, shall have both the part number and serial number on the outside of the front panel unless specifically deleted by Engineering drawings. This identification shall be decalcomania (3.4.9) in the upper left-hand corner when facing the unit.

3.4.17 **Reference designations.** Equipment shall be marked with the reference designation for each part and sub-assembly with the identification numbers specified on the Engineering drawing (IEEE200). Acceptable marking methods include stenciling (3.8), rubber stamp/ink jet/laser jet (3.4.2), decalcomania (3.4.9) and silk screening (3.4.7). Ink markings should be uniform and legible. Hand lettering in ink of reference designators on sheet metal parts is unacceptable.

4. QUALITY ASSURANCE PROVISIONS.

4.1 **Responsibility for inspection.** Organizationally assigned personnel responsible for performing the requirements described herein are also primarily responsible for ensuring the quality of the process activities. Other personnel within the operating department, or others as deemed appropriate by management may be assigned to verify compliance with requirements listed herein. Quality Assurance departments may perform inspections or audits as necessary to provide adequate oversight of process controls.

4.2 **Monitoring procedures for equipment used in process.** The process owner or department performing the process shall verify by process audits or inspection that all equipment used in this process are per the requirements specified herein.

4.3 **Monitoring procedures for materials used in process.** The process owner or department performing the process shall verify by process audits or inspection that all materials used in this process are per the requirements specified herein and are within any applicable shelf life limits.

4.4 **Inspected identification markings.** All identification markings shall be inspected for the following:

a. Neatness and legibility.

b. Conformity to Engineering drawing requirements.

c. Conformity to the requirements of this specification.

4.5 **Solvent resistance.** This test applies to reference designators requiring minimum solvent resistance. These designators can be on sheet metal or equipment face plates.

4.5.1 **Marking cure time.** Allow markings, stencil, silk screen stencil, or rubber stamp to adequately dry prior to further processing or transportation.

4.5.2 **Procedure.** Using a clean cheesecloth dampened with isopropyl alcohol, gently rub the markings for 5 to 15 seconds.

4.5.3 **Inspection.** Inspect the markings for damage after residual solvent has dried. Damage includes fading, chipping, or removal of the markings.

4.6 **Temporary markings.** Production shall insure that all temporary markings, shop notes and other markings not required for permanent identification are removed from the surfaces before being primed or painted.

5. PREPARATION FOR DELIVERY.

This section is not applicable to this specification.

6. NOTES.

6.1 **Intended use.** This specification is intended to describe the required methods for marking parts, assemblies and equipment.

a. **Rubber stamping/Ink jet/Laser jet method.** Most widely used for permanent and non-permanent markings. Also acceptable when no method of marking is referenced on the Engineering drawing.

b. **Metal stamping / engraving method.** Provides permanent marking when applied directly to the surface of the part.

c. **Vibration pencil method.** Provides markings for forged hydraulic assemblies. Also used for marking small fiberglass laminated and phenolic parts. Care should be taken not to damage fibers.

d. **Metal tag method.** Provides permanent or non-permanent markings. Also used when the size and design of a part or assembly makes it impractical to apply the marking directly on the part or to attach a nameplate. Also recommended for an assembly being furnished as a spare.

e. **Stencils method.** Used on plastic and metallic flat surfaces. Also recommended for surfaces that are more adaptable for stenciling such as flight controls, radomes, access doors, etc.

f. **Silk screening method.** Used for marking electronic parts such as power transformers and front face panels.

g. **Nameplates method.** Used for marking sub-assemblies, assemblies, end items and black boxes.

h. **Decalcomania method.** Plastic decals may be used as above (nameplates) and used for marking curved surfaces, and soft plastic surfaces.

i. **Hand lettering method.** Used as an inexpensive in-house method where appearance is not critical.

j. **Electrical wiring method.** Used for marking and identification of electrical wires per TPS 8-20.

6.2 **Definitions.** For the purpose of this specification, the following definitions apply.

6.2.1 **Identifying number.** The number used to identify an item that has been assigned by the Engineering Drawing, Specification, Standards or the Planning Department. This number will be a drawing (with dash numbers) specification, standard or a manufacturing number to aid in manufacturing.

6.2.2 **Manufacturer.** An individual, firm company or corporation engaged in the fabrication of finished and semifinished products.

6.2.3 **Part.** One piece, or two or more pieces joined together which are not normally disassembled without destruction of designed use and which are intended to be joined with other pieces.

6.2.4 **Assembly.** A number of parts or subassemblies or any combination joined together to perform a specific function. They shall be capable of disassembly.

NOTE: The distinction between an assembly and a sub-assembly is determined by the individual application. An assembly in one instance may be a sub-assembly in another where it forms a portion of an assembly. For clarity purposes, sub-assemblies when joined together with the intent not to be disassembled without destruction of designed use or not normally disassembled shall be marked as a part.

6.2.5 **Permanently attached part.** Two or more parts forming a part or sub-assembly that have been welded, riveted, soldered or adhesive bonded with the intent not to be disassembled.

6.2.6 **Part number.** The number assigned by the Design Specification, and/or Standards Activity whose Engineering drawings control the design of the item. It may be a specification or drawing number depending on the numbering system.

6.2.7 **Unit.** An assembly or any combination of parts, sub-assemblies and assemblies mounted together, normally capable of independent operation in a variety of situations.

6.2.8 **Item.** A non–specific term used to denote any product, including system, material, parts, sub-assemblies, accessories, etc.

6.3 **Drawing note.** If a specific marking method is desired it shall be specified on the Engineering drawing. Metal stamping, engraving, and vibrating pencil methods are controlled by TPS 4-10, which must be specified on the Engineering drawing to authorize their use. If a specific marking method is not desired, the drawing note should read "Identify or mark parts, assemblies, and equipment per TPS 4-1".

L3 communications Integrated Systems	TITLE **IDENTIFICATION MARKING OF PARTS, ASSEMBLIES, AND EQUIPMENT**	NUMBER **TPS 4-1**	REV **M**
	ATTACHMENT NO. **069556A** / SEQUENCE NO. / DATE ISSUED **17 September 2003** / PAGE 1 OF 2		
	DOCUMENT TYPE **AMENDMENT**		

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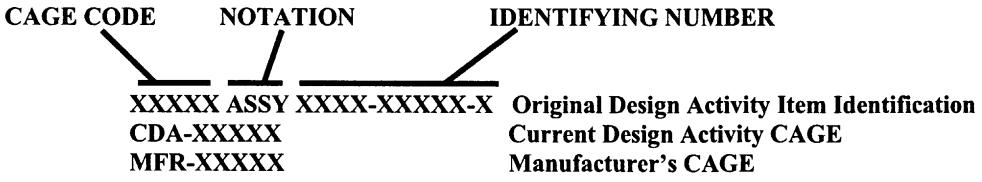
B.B. Pope 17 Sept. 2003	J. Threlfall, Jr. 17 Sept. 2003	J. Threlfall, Jr. 17 Sept. 2003	J. Threlfall, Jr. 17 Sept. 2003

This amendment forms a part of process specification TPS 4-1M, dated 20 August 2002, and is mandatory for use when the basic process specification is applicable.

Add paragraph 3.3.7.1 to read as follows:

3.3.7.1 When the design activity is not the original design activity, the markings shall be per Figure 6A.



Alternate Method

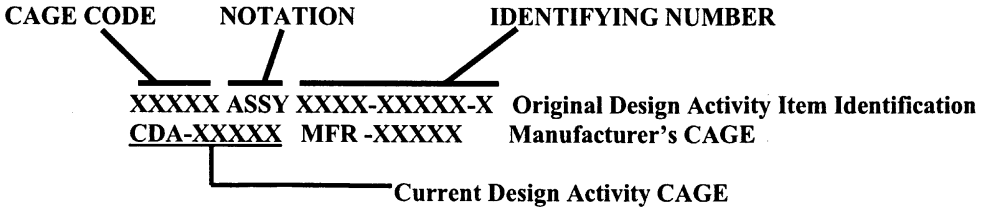


FIGURE 6A
ASSEMBLY IDENTIFICATION - MANUFACTURERS OTHER THAN DESIGN ACTIVITY

Reword paragraph 3.3.8 and subparagraphs to read as follows:

3.3.8 PMA marking.

3.3.8.1 Each replacement or modification part produced for sale under a Parts Manufacturer Approval issued per paragraph 21.303 of FAR Part 21 shall be permanently and legibly marked with identifying information per FAR Part 45. This includes each part or subassembly that leaves the Production Shops and is not joined or attached to other identified parts or assemblies. Each part shall be permanently identified with the following information:

a. The letters "FAA-PMA".
b. The part number per the Engineering Drawing.
c. The name and model designation of each type certified product on which the part is eligible for installation
d. Name of manufacturer and CAGE Code.
e. Serial number (optional).

3.3.8.2 When parts are manufactured under a Parts Manufacturer Approval the markings shall be arranged as shown in Figure 7.

(PMA letters) → FAA PMA (PMA letters may be either left justified or centered)

(Part Number) → XXXXXXXX

(Eligible for installation on) → XXXXXXXX

(Name of Manufacturer and CAGE Code) → XXXXXXXX

(Serial Number (Optional)) → XXXXXXXX

FIGURE 7
PMA IDENTIFICATION